

REMARKS

I. Introduction

The final Office Action of September 3, 2009 has been reviewed and the Examiner's comments carefully considered. Claims 1-80 were originally pending in this application. The Amendment of June 2, 2009 cancelled claims 33, 34, 37, 38, 41, and 42. In addition, claims 1-30, 32, 36, 40, 43-45, and 47-80 were withdrawn from further consideration in view of an earlier restriction requirement. The Applicants reserve the right to file a divisional application directed to the non-elected claims. Accordingly, claims 31, 35, 39, and 46 are currently under examination in this application, and claim 31 is in independent form. Based on the following discussion, the Applicants respectfully request favorable reconsideration of the claims.

II. Interview of December 29, 2009

The Applicants would like to thank Examiner Miska for the courtesies extended to the Applicants' representative during the telephonic interview of December 29, 2009. During the interview, Applicants' representative discussed the differences between independent claim 31 and the combination of United States Patent No. 6,411,569 to Megner et al. (hereinafter "the Megner patent") and United States Patent No. 6,992,952 to Endo et al. (hereinafter "the Endo patent"). In addition, several amendments were also discussed with the Examiner. The Examiner was not persuaded by these suggested arguments or amendments.

III. Rejection under 35 U.S.C. §103

Claims 31, 35, 39, and 46 stand rejected under 35 U.S.C. §103(a) as being obvious over the Megner patent in view of the Endo patent. In view of the following remarks, the Applicants respectfully request reconsideration of this rejection.

A. The Present Invention

As defined by independent claim 31, the present invention is directed to a radio controlled watch that includes an antenna for receiving a radio wave including time information; a watch device for causing a display portion to display time information such as a present time

by the radio wave received by the antenna; and a watch case for accommodating the antenna and the watch device. The watch case is constituted by a metal and comprises a metallic watch case body and a metallic back cover attached and fixed to the watch case body. The watch case and the antenna are set in such a manner that a gap D2 from an internal surface of the back cover of the watch case to the antenna ranges from 100 μ m to 700 μ m.

As shown in FIGS. 10 and 11 and described on page 86, line 12 to page 87, line 24 under the heading “2-2. A relationship between the body thickness T1 and the receiving sensitivity” in the specification of the present application, important features of the present invention are described. Namely, in the experiment described therein, the watch case body (25) and the back cover (27) are manufactured from a metal such as SUS304, SUS304L, SUS316, SUS316L, and the like. In addition, as described starting on page 91, line 14 under the heading “2-5. A relationship between the distance D2 from the antenna (26) to the back cover (27) and the receiving sensitivity”, and in FIG. 15, the gain can be increased and the receiving sensitivity can be enhanced if the distance D2 between the antenna (26) and the back cover (27) is increased. However, the rise in the gain is saturated to be constant if the distance D2 exceeds 5000 μ m. Therefore, if the distance D2 is set to be 0 to 5000 μ m, the gain can be enhanced. Particularly, by setting the gap D2 from the internal surface of the back cover of the watch case to the antenna to be 100 μ m to 700 μ m as required by independent claim 31, it is possible to maintain a high gain of the antenna, an excellent receiving sensitivity, a strength which is usable for the watch case, and the like. In addition, it is possible to obtain the back cover for the watch case that considers an appearance, a workability, a corrosion resistance, and the like.

In addition, by setting a gap D2 from the internal surface of the back cover to the antenna based on a receiving sensitivity, it is possible to reduce the disturbance of a resonant phenomenon in the vicinity of the antenna which is caused by a metal material. Therefore, it is possible to enhance the receiving sensitivity also in the metal watch case. As a result, it is possible to use a metal having high quality appearance, such as titanium, a titanium alloy, stainless steel, or tantalum carbide, as well as low receiving sensitivity, low frequency selectivity, and high electric resistivity as the watch case without sacrificing the receiving

sensitivity. Consequently, it is possible to enhance functions in respect of the mechanism of the watch as well as the appearance of the watch case.

The invention of independent claim 31 was accomplished from such experimental results. The setting of gap D2 at the values required by independent claim 31 was not disclosed or suggested in the prior art references of record and would not be a mere design choice. Furthermore, the section of the specification under the heading “2-2. A relationship between the body thickness T1 and the receiving sensitivity” further describes that the reduction in the gain is saturated to be constant when the body thickness T1 exceeds 5000 μm and a value obtained at this time is the smallest (*see* FIG. 12 of the present application). As a result, by setting the body thickness T1 to be 0 to 5000 μm it is possible to enhance the gain for the smallest value.

In consideration of a strength at which the watch case can be used within the range described above, it is desirable that the body thickness T1 should be set within a range of 300 μm to 5000 μm . Furthermore, in order to form an optimum body in consideration of an appearance, a workability, a corrosion resistance, and the like for the watch case, the body thickness T1 should be set within a range of 500 μm to 2000 μm .

In addition, as described under the heading “2-3. A relationship between the distance D1 from the antenna 26 to the watch case body 25 and the receiving sensitivity” on page 88, line 1 of the specification of the present application, the gain can be increased and the receiving sensitivity can be enhanced if the distance D1 between the antenna (26) and the watch case body (25) is increased, and the rise in the gain is saturated to be constant if the distance D1 exceeds 40,000 μm (*see* FIG.13 of the present application). Therefore, if the distance D1 is set to be 0 to 40,000 μm , the gain can be enhanced. In consideration of a size which can be used as the watch case within the range described above, it is desirable that the distance D1 be set to be 500 μm to 10,000 μm .

Furthermore, as described by the section of the specification under the heading “2-4. A relationship between the back cover thickness T2 and the receiving sensitivity” on page 89, line 3 to page 90, line 22 of the specification of the present application, the gain of the received signal is suddenly reduced from approximately -43.4 dB with the back cover thickness T2 of 0 μm (*i.e.*, a state in which the back cover (27) is not provided) to 800 μm , and the gain is

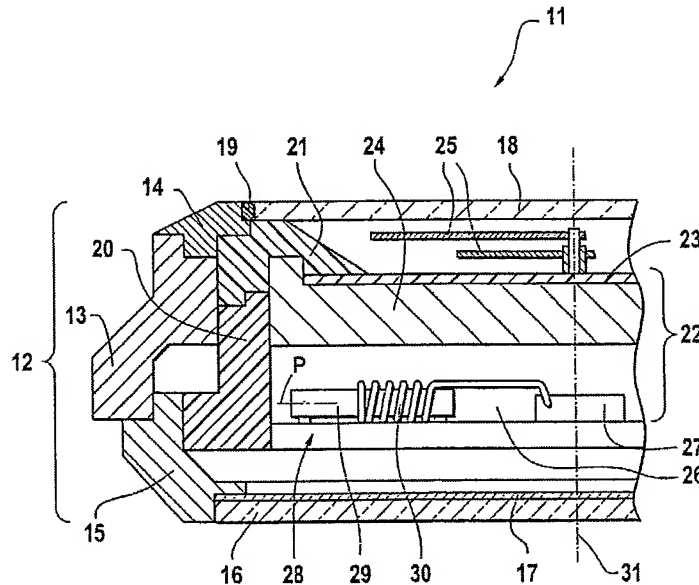
not changed greatly with the back cover thickness T2 of 800 μm to 5000 μm (*see* FIG. 14 of the present application). In other words, it was found that the back cover thickness T2 has the smallest value with 800 μm . Therefore, it is desirable that the back cover thickness T2 should be set within a range of 100 μm to 5000 μm in consideration of a strength at which the watch case can be used within the range described above.

Accordingly, the watch case of the present invention is manufactured from a metal and a distance between the antenna and the watch case, that is, a back body thickness T1 of the watch case body of the watch case, a back cover thickness T2 of the back cover of the watch case, a gap D1 from the internal surface of the watch case body to the antenna, and a gap D2 from the internal surface of the back cover to the antenna are set based on a receiving sensitivity. Consequently, it is possible to reduce the disturbance of a resonant phenomenon in the vicinity of the antenna which is caused by the metal material forming the watch case. Therefore, it is possible to enhance the receiving sensitivity in the metal watch case and to use a metal having a high quality appearance, such as titanium, a titanium alloy, stainless steel, or tantalum carbide, as well as low receiving sensitivity, low frequency selectivity, and a high electric resistivity as the watch case.

B. The Megner patent

The Megner patent is directed to a radio-controlled wristwatch (11) that includes a casing (12). A central portion (13) of the casing (12) is disposed generally centrally with reference to a longitudinal center axis of the casing (12), and is formed of metal at least on the exterior thereof. An antenna core (29) is disposed within a chamber defined by the casing (12). The antenna core (29) lies on a plane oriented transversely with respect to the longitudinal axis. A spacer ring (20) is disposed in the chamber between the central portion (13) and the antenna core (29). The spacer ring (20) is formed of an electrically non-conductive material.

The antenna core (29) is arranged between two disks made of the material without electric conductivity (*i.e.*, between a glass (18) and a bottom (16)) of the casing at specific intervals in a radial direction of the metallic center (13) (*see* FIG. 1 of the Megner patent reproduced below).



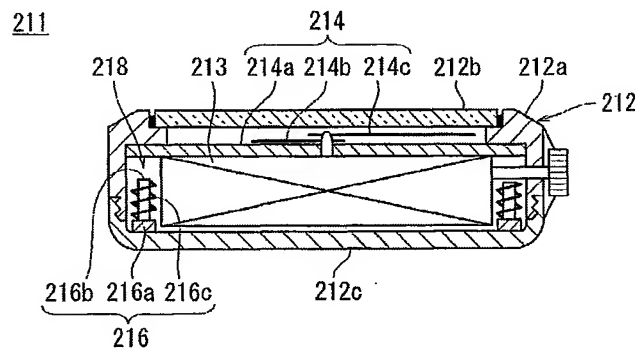
Namely, in the Megner patent, the bottom (16) which is pressure fitted in the casing (12) is made from a firm plate without electroconductivity, such as ceramic or glass. Moreover, in the Megner patent, as disclosed at column 3, lines 51-67, if the antenna (28) were arranged in the immediate proximity of the metal casing (12), then, not only would there be a (basically compensatable) resonance detuning effect, but in particular there would also be such a (non-compensatable) reduction in quality that, even with a very sensitive receiver (27), it would no longer be possible to provide useful reception conditions. Therefore, there is an interposition of a spacer ring (20) between the metal wristwatch casing (12) and the wristwatch works (22) provided with the antenna (28) to ensure that the ferrite core (29) remains at a sufficient radial spacing from the interior of the metal casing (12).

C. The Endo patent

The Endo patent relates to a wrist watch that contains an internal (electric) tag which is used for radio frequency identification (RFID) in which sensitivity is comparatively high. Specifically, as shown in Figs. 6 and 7 of the Endo patent and indicated by the Examiner, the wrist watch containing an internal tag comprises a case (212) having a ring shaped case

(212a), a glass lid (212b), and a rear lid (212c); a drive section (213) which is housed within the case (212); a display section (214) which is driven by the drive section (213) and displays a time instant; and an RFID tag (218) which includes an antenna (216) and an IC chip (217). In addition, the antenna (216) includes a magnetic backing (216a) which is provided to follow around the inner surface of the rear lid (212c), a pair of pin shaped magnetic core members (216b) which are provided to stand upon this magnetic backing (216a), and a pair of coils (216c) which are wound in a helical manner upon these magnetic core members (216b) as shown in FIG. 6 of the Endo patent (reproduced below).

FIG. 6



As a result, the magnetic flux bundle in the antenna (216), as shown by the solid arrows in FIG. 7 of the Endo patent, enters from one of the magnetic core members (216b), passes through the magnetic backing (216a), and emerges from the other one of the magnetic core members (216b), so as to describe a loop. Due to this, the directions of the electrical currents that flow in the connected coils (216c), which are wound upon the pair of magnetic core members (216b), are mutually opposite in the vicinity of the ring shaped case (212a) such that the induced electrical current which is generated by the coil (216c) of one of the magnetic core members (216b) tends to quench the induced electrical current which is generated by the coil (216c) of the other of the magnetic core members (216b). As a result, no significant induced electrical current actually flows in the ring shaped case (212a).

Furthermore, since the magnetic backing (216a) is provided to follow along the inner surface of the rear lid (212c), the axis of magnetization of this magnetic backing (216a) is parallel to the rear lid (212c) such that no eddy current flows in this rear lid (212c) even if it is made of metal. Accordingly, it is possible to avoid reduction of the sensitivity of the antenna (216) caused by the flowing of induced current and eddy current.

However, in the Endo patent, the antenna (216) has the special antenna shape of the pair of magnetic core members (216b) and coils (216c), which are wound upon the pair of magnetic core members (216b), because it is used for a watch that includes an RFID tag rather than for a radio controlled watch. Accordingly, since the antenna (216) of the RFID tag of the watch of the Endo patent functions on different principles than a radio controlled watch, a metallic back cover may be utilized.

D. Differences between the claimed invention and the cited prior art

The Megner patent, however, does not teach or suggest that the watch case comprises a metallic watch case body and a metallic back cover attached and fixed to the watch case body as required by independent claim 31. Instead, the Megner patent requires the bottom plate (16) (*i.e.*, the back cover) to be force-fitted in the casing (12) and the bottom plate to be made of a stiff plate of electrically non-conducting material, such as ceramic or glass (*see* column 3, lines 7-9 of the Megner patent). Accordingly, the Megner patent specifically requires the antenna (28) to be disposed between two discs of *electrically non-conducting material* (*i.e.*, the wristwatch glass (18) and the casing bottom (16)).

The Examiner, however, contends that it would have been obvious to one of ordinary skill in the art to provide the watch disclosed in the Megner patent with a metallic back cover because of a teaching in the Endo patent that suggests that a rear lid (212c) may be made of metal (*see* column 19, line 56 of the Endo patent). However, the Megner patent specifically requires the antenna (28) to be disposed between two discs of electrically non-conducting material (*i.e.*, the wristwatch glass (18) and the casing bottom (16)) in order to function properly (*see* column 4, lines 15-30 of the Megner patent). Accordingly, the Megner patent teaches away from providing a metallic back cover to the watch disclosed therein. In addition and described hereinabove, the Endo patent is directed to a wrist watch that includes an RFID tag. This tag

includes an antenna (216). However, the antenna (216) has a special antenna shape of the pair of magnetic core members (216b) and coils (216c) which are wound upon the pair of magnetic core members (216b) because it is used for a watch that includes an RFID tag rather than for a radio controlled watch. Since the antenna (216) of the RFID tag of the watch of the Endo patent functions on different principles than a radio controlled watch, a metallic back cover may be utilized in the Endo patent.

Accordingly, the Megner patent, either considered alone or in combination with the Endo patent, does not teach or suggest a watch case having a watch case body and a metallic back cover attached and fixed to the watch case body.

In addition, the Megner patent, whether considered alone or in combination with the Endo patent, does not teach or suggest, as the Examiner admits on page 3 of the Office Action, that the watch case and the antenna are set in such a manner that a gap D1 from an internal surface of the back cover of the watch case to the antenna ranges from 100 μ m to 700 μ m as required by claim 31. By optimizing the distance of the thickness of the watch case body and back cover and the distance between the back cover and the antenna, the functionality of the antenna is maintained even though the watch case body and the back cover are manufactured from a metallic material as described in greater detail hereinafter. In addition, the optimization of these distances also allows for excellent reception of the radio waves, thereby improving reception performance and watch accuracy.

Specifically, by setting the gap D2 from the internal surface of the back cover of the watch case to the antenna to be 100 μ m to 700 μ m as required by independent claim 31, it is possible to maintain a high gain of the antenna, an excellent receiving sensitivity, and a strength which is usable for the watch case. In addition, by setting the gap D2 within this range, it is possible to obtain an optimum back cover of the watch case which considers an appearance, a workability, and a corrosion resistance for the watch case.

On the other hand, although antenna (28) is shown in FIG. 1 in the Megner patent, the numerical value for the gap from an internal surface of the back cover of the watch case to the antenna is not specifically shown or described. Accordingly, these numerical values were not contemplated by the Megner patent and one of ordinary skill in the art would not have found the

setting of these values to be mere design choice as these numerical values have been shown to make it possible to maintain a high gain of the antenna, an excellent receiving sensitivity, and a strength which is usable for the watch case that is made of metal as described in greater detail hereinabove.

Furthermore, the Endo patent does not teach or suggest the setting of a numerical value for the gap from an internal surface of the back cover of the watch case to the antenna as required by independent claim 31 and, therefore, does not cure this deficiency.

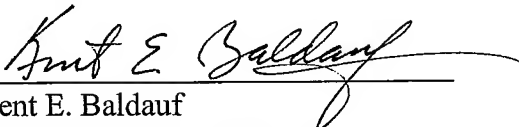
For the foregoing reasons, the Applicants believe that the subject matter of independent claim 31 is not rendered obvious by the combination of the Megner patent and the Endo patent. Reconsideration of the rejection of claim 31 is respectfully requested.

Claims 35, 39, and 46 depend from and add further limitations to independent claim 31 and are believed to be patentable for at least the reasons discussed hereinabove in connection with independent claim 31. Reconsideration of the rejection of claims 35, 39, and 46 is respectfully requested.

IV. Conclusion

Based on the foregoing remarks, reconsideration of the rejections and allowance of pending claims 31, 35, 39, and 46 are respectfully requested. Should the Examiner have any questions, or wish to discuss the application in further detail, the Examiner is invited to contact the Applicants' undersigned representative by telephone at 412-471-8815.

Respectfully submitted,
THE WEBB LAW FIRM

By 
Kent E. Baldauf
Registration No. 25,826
Attorney for Applicants
436 Seventh Avenue
700 Koppers Building
Pittsburgh, PA 15219
Telephone: (412) 471-8815
Facsimile: (412) 471-4094
E-mail: webblaw@webblaw.com